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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
09/514,023	02/25/00	GURTLER C	MO-5451/LEA

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PATENT DEPARTMENT
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EXAMINER	
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ART UNIT	PAPER NUMBER
1624	8

DATE MAILED: 06/01/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary	Application No. 09/514,023	Applicant(s) GURTLER ET AL.	
	Examin r Steven M. Reid	Art Unit 1624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 May 2001* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-21* is/are pending in the application.

4a) Of the above claim(s) *2* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 and 3-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

15) ☒ Notice of References Cited (PTO-892)
16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
17) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *2,4* .
18) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
19) ☐ Notice of Informal Patent Application (PTO-152)
20) ☐ Other: .

DETAILED ACTION

Claims 1 – 21 are pending.

Election/Restrictions

1. Applicant's election without traverse of Group II in Paper No. 7 is acknowledged. The claims of Group II are drawn to a catalytic process of preparing *cyclic* compounds. It is noted that claim 2, drawn solely to a catalytic process of preparing *polymeric* compounds, was inadvertently included in Group II, and thus clearly belongs in Group I drawn to said catalytic process of preparing *polymeric* compounds. Therefore, claim 2 is hereby withdrawn. The restriction requirement is maintained.

Specification

2. The disclosure is objected to because of the following informality: the ruthenium catalyst graphically depicted in the reaction of Example 4 (page 15 of the specification) does not correspond to the ruthenium catalyst recited in the text of Example 4.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1 – 21 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention:

a. Instant claims are rejected as being vague and indefinite because the following terms, where they appear throughout the claims, are not defined or not fully defined:

cyclic compounds, catalyst component, transition metal carbenes, transition metal compounds, transition metal salts, alkylating reagent, ionic liquids, carbocyclic compounds, heterocyclic compounds, substituent, heteroatom, heteroatoms, alkyl, cycloalkyl, aromatic or non-aromatic carbocyclic rings, carboxylic acids, esters, ethers, epoxides, silyl ethers, thioethers, thioacetals, anhydrides, imines, silylenol ethers, ammonium salts, amides, nitriles, perfluoroalkyl groups, geminal dialkyl groups, alkynes, alkenes, halogens, alcohols, ketones, aldehydes, carbamates, carbonates, urethanes, sulphonates, sulphones, sulphonamides, nitro groups, organosilane units, metal centres and oxy-containing heterocycles, nitrogen- containing heterocycles, sulphur-containing heterocycles, and phosphorus-containing heterocycles, α,ω-dienes, organic substituent, N-aryl, aryl, catalyst precursors, quaternary ammonium halide, quaternary phosphonium halide, phosphorus compounds, amines, perfluorinated compounds, metal alkoxides, and organic solvents.

Examples or preferred embodiments of said terms where they are proffered in the specification are non-limiting and thus open-ended.

b. Claims 4, 6, 7, 14 and claims dependent thereon are rejected because the following terms lack proper antecedent basis:

i. In claims 4 and 6, "starting material*s*" (emphasis added);

ii. In claim 14, "catalyst precursors";

iii. In claim 5, "heteroatom*s*" (emphasis added);

iv. In claim 7, "the molecule"; and

v. In claim 21, "reaction medium".

c. Claims 1 and 3 – 21 are rejected because the terms "comprise" and "comprising", where they are employed therein *except* that in the phrase "comprising the step" in claim 1, are open-ended and thus render instant claims vague and indefinite. Additionally, the phrases "are comprise" in claim 5 and "from the consisting of" in claim 20 are unclear. The term "may" in claim 6 does not indicate whether the members of a group recited therein are included or not.

It appears that applicants intend to set forth Markush groups in instant claims that employ said terms. The Examiner invites applicants' attention to MPEP 2173.05(h) for examples of proper conventional or alternative Markush-type language if they wish to employ it.

d. Claim 7 is rejected as being vague and indefinite for several reasons. First, variables R and R^1 are given two different definitions. Which definition applies? Second, claim language provides for R being "in any other position in the molecule" but does not set forth what position that may be. Last, in what appears to be a typographical error, instant claim refers to "a substituent NRR^1 in the position to a double bond", thereby omitting what that position is.

e. A broad range or limitation together with a narrow range or limitation that falls within the broad range or limitation (in the same claim) is considered indefinite, since the resulting claim does not clearly set forth the metes and bounds of the patent protection desired. Note the explanation given by the Board of Patent Appeals and Interferences in *Ex parte Wu*, 10 USPQ2d 2031, 2033 (Bd. Pat. App. & Inter. 1989), as to where broad language is followed by "such as" and then narrow language. The Board stated that this can render a claim indefinite by raising a question or doubt as to whether the feature introduced by such language is (a) merely exemplary of the remainder of the claim, and therefore not required, or (b) a required feature of the claims. Note also, for example, the

decisions of *Ex parte Steigewald*, 131 USPQ 74 (Bd. App. 1961); *Ex parte Hall*, 83 USPQ 38 (Bd. App. 1948); and *Ex parte Hasche*, 86 USPQ 481 (Bd. App. 1949). In the present instance, claim 9 recites the broad recitation "n is 1, 2, 3, or 4", and the claim also recites "preferably 1 or 2, particularly preferably 1" which is the narrower statement of the range/limitation. Also, claim 12 recites the broad recitation "wherein the α,ω-dienes used are diallylamine or 3-amino-1,7,octadiene", and the claim also recites "particularly preferably in their N-carboxymethyl-protected form" which is the narrower statement of the range/limitation. With further regard to claim 12, it is not clear whether the limitation "particularly preferably" refers to all following material or just some of it.

f. Claims 13 and those claims dependent thereon are rejected for several reasons:

i. Structure V depicted in claim 13 requires double bonds between Mo and R^3 or R^4, but R^3 and R^4 as defined in claim 13 are moieties that *cannot* form double bonds with any atom (e.g., hydrogen, alkyl, carboxylate);

ii. Structure VI depicted therein provides for a cationic ruthenium species with a charge "m^+", but does not indicate what the charge-balancing anion(s) may be. Applicants must define a compound in its entirety, not just that portion of which they believe to be the active species; and

iii. Variables "R^3 to R^7 may be linked to one another in cyclic compounds", but instant claim does not indicate how any of R^3 to R^7 are linked, much less what "cyclic compounds" are produced by the linking of said variables. How does one link hydrogen with hydrogen?

g. Claim 14 and claims dependent thereon are rejected because R^3 to R^5 are not "defined above" as claimed.

h. Claim 16 recites the limitation "cycloalkyl radical" in the definition of R^3 to R^5. There is insufficient antecedent basis for this limitation in the claim. Claim 15, from which instant claim depends, provides only for alkyl radicals, not cycloalkyl radicals. Note that claim 13, from which claim 15 depends, defines separately "cycloalkyl" and "alkyl" radicals.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1, 3 – 8, and 12 – 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Armstrong (reference AS on applicants' PTO-1449) in view of Olivier *et al.* Armstrong discloses olefin metathesis processes by which various dienes, including α,ω-dienes, are treated with transition metal carbenes, particularly molybdenum or ruthenium carbene catalysts, in addition to carbene catalyst precursors such as $WCl_4(OAr)_2$, to furnish cyclic compounds produced by ring closing

metathesis ("RCM"). Armstrong indicates that a wide variety of functional groups, solvent, and solvent combinations, may be tolerated by said carbene catalysts, and in particularl the ruthenium-based catalysts. Armstrong does not teach that said RCM is performed in the presence of ionic liquids. Olivier *et al*, however, teach olefin metathesis in ionic liquids catalyzed by transition metal complexes in addition to the carbene catalyst precursor $WCl_4(OAr)_2$. Olivier *et al* stress that the plurality of available ionic liquids of varying degrees of acidity and complexing ability are amenable to a wide variety of transition metal catalysts, and suggest that most of the known transition-metal catalyzed reactions could be performed in said ionic liquids by judicious selection of catalyst/ionic liquid combinations. Furthermore, Olivier *et al* teach that the use of ionic liquids in two-phase solvent systems present the advantages over homogeneous reaction media in that product solubility and separation is much easier and catalyst recovery, particularly when a catalyst is expensive, is straightforward. Thus it would have been obvious to a person of ordinary skill at the time of instant invention to carry out the ring closing metathesis reactions catalyzed by transition metal carbenes in ionic liquid media by the process disclosed by Armstrong as modified by Olivier *et al.* One of ordinary skill would have been motivated to combine the teachings of Armstrong and Olivier *et al* in view of the clear industrial advantage of product separation achieved with use of ionic liquids and the significant economic benefit of costly catalyst recovery in reaction media that contain ionic liquids.

Any inquiry concerning this communication from the examiner should be directed to Steven M. Reid whose telephone number is (703) 308-7023. The examiner can normally be reached on Monday through Friday from 7:30 AM to 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mukund J. Shah, can be reached on (703) 308-4716. The fax phone number for the organization where this application or proceeding is assigned is (703) 308-4556.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1235.

SMR

Steven M. Reid, Ph.D.
Examiner
Art Unit 1624

Mukund J. Shah

Mukund J. Shah
Supervisory Patent Examiner
Art Unit 1624